

IN THE CLAIMS

1. A method for controlling the movement of datapackets  
in a hierarchical network, the method comprising the steps  
5 of:

using a class-based queue traffic shaper to enforce  
a plurality of service-level agreement policies on individual  
connection sessions by limiting a maximum data throughput for  
each connection in a hierarchical network;

10 distinguishing in said class-based queue traffic  
shaper amongst datapackets according to at least of their  
respective source and destination IP-addresses;

limit checking in one clock cycle for an entire  
network hierarchy above a particular node to enforce said  
15 plurality of service-level agreement policies according to  
said respective source and destination IP-addresses.

2. The method of claim 1, further comprising the steps  
of:

20 associating a service-level policy that limits  
allowable bandwidths to particular nodes in said hierarchical  
network;

classifying datapackets moving through said  
hierarchical network according to a particular service-level  
25 policy; and

managing all datapackets moving through said  
hierarchical network from a single queue in which each entry  
includes service-level policy bandwidth allowances for every  
hierarchical node in said network through which a  
30 corresponding datapacket must pass.

3. The method of claim 1, further comprising the step of:

testing in parallel whether a particular datapacket should be delayed in a buffer or sent along for every  
5 hierarchical node in said network through which it must pass.

4. The method of claim 1, further comprising the step of:

constructing a single queue of entries associated  
10 with corresponding datapackets passing through said hierarchical network such that each entry includes a pointer to the actual packet and pointers to the corresponding hierarchical node that point to the data structure containing available bandwidth credits in said network through which a  
15 corresponding datapacket must pass.

5. A means for managing the distribution of datapackets, comprising:

means for associating a service-level policy that  
20 limits allowable bandwidths to particular nodes in a hierarchical network;

means for classifying datapackets moving through said hierarchical network according to a particular service-level policy; and

25 means for managing all datapackets moving through said hierarchical network from a single queue in which each entry includes service-level policy bandwidth allowances for every hierarchical node in said network through which a corresponding datapacket must pass.

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6. The means of claim 5, further comprising:

means for testing in parallel whether a particular datapacket should be delayed in a buffer or sent along for every hierarchical node in said network through which it must pass.

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7. The means of claim 5, further comprising:

means for constructing a single queue of entries associated with corresponding datapackets passing through said hierarchical network such that each entry includes a  
10 pointer to the actual packet and pointers to the corresponding hierarchical node that point to the data structure containing available bandwidth credits for every hierarchical node in said network through which a corresponding datapacket must pass.

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8. A network management system, comprising:

a protocol processor providing for header inspection of datapackets circulating through a network and providing for an information output comprising at least one  
20 of source IP-address, destination IP-address, port number, and application type;

a classifier connected to receive said information output and able to associate a particular datapacket with a particular network node and a corresponding service-level  
25 policy bandwidth allowance;

a single queue comprising individual entries related to said datapackets circulating through said network, and further related to all network nodes through which each must pass; and

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a traffic-shaping cell providing for an inspection of each one of said individual entries and for outputting a single decision whether to pass through or buffer each of

said datapackets in all network nodes through which each must pass.

5           9. The system of claim 8, further comprising:  
            an output scheduler and marker for identifying  
particular ones of the individual entries in the single queue  
that are to be passed through or buffered.

10          10. The system of claim 8, wherein:  
            at least one of the protocol processor, classifier,  
and traffic-shaping cell, are implemented as a semiconductor  
intellectual property and operate at run-time with the single  
queue.